

CLAIMS

1. A method in a satellite positioning system receiver, comprising:

receiving a plurality of issues of ephemeris data for at least one satellite;

deriving relatively low-resolution satellite orbital information for the at least one satellite from satellite information obtained from the corresponding plurality of issues of ephemeris data received for the at least one satellite.

2. The method of Claim 1, deriving the satellite orbital information for the at least one satellite includes obtaining average satellite orbital coefficients from the corresponding plurality of issues of ephemeris data and reducing the resolution of the satellite orbital coefficients obtained.

3. The method of Claim 1, deriving the satellite orbital information for the at least one satellite includes reducing the precision of satellite information obtained from the corresponding plurality of issues of ephemeris data to a resolution level comparable with almanac data for the same satellite.

4. The method of Claim 1, deriving the satellite orbital information for the at least one satellite includes eliminating portions of the corresponding plurality of issues of ephemeris data received for the at least one satellite.

5. The method of Claim 4, eliminating portions of the corresponding plurality of issues of ephemeris data received includes eliminating at least one of sine and cosine harmonic terms.

6. The method of Claim 1, deriving the satellite orbital information includes forming a plurality of estimated satellite locations for the at least one satellite based upon the plurality of issues of ephemeris data for the corresponding satellite, and computing satellite orbital coefficients for the at least one satellite based upon the estimated satellite locations.

7. The method of Claim 6, converting the satellite orbital coefficients to almanac data resolution and format.

8. The method of Claim 1,

obtaining satellite positioning and velocity information from each of the plurality of issues of ephemeris data;

storing the satellite positioning and velocity information on the satellite positioning system receiver;

deriving relatively low-resolution satellite orbital information for the at least one satellite from satellite location and velocity information obtained from the corresponding plurality of issues of ephemeris data.

9. The method of Claim 1, determining location and velocity information for the at least one satellite from the corresponding satellite orbital information derived.

10. The method of Claim 9, determining a Doppler estimate and uncertainty range for the at least one satellite from the corresponding satellite location and velocity information.

11. The method of Claim 1, updating the satellite orbital information for the at least one satellite with updated ephemeris data.

12. The method of Claim 11, obtaining updated ephemeris data if updated ephemeris data is not stored on the satellite positioning system receiver.

13. A method in a satellite positioning system receiver having stored almanac data, the method comprising:

determining information for a satellite using ephemeris data;

determining information for the same satellite using the stored almanac data;

determining an error between the satellite information determined from the ephemeris data and the satellite information determined from the stored almanac data;

updating the stored almanac data based upon the error.

14. The method of Claim 13,

determining satellite information for the same satellite includes determining satellite location and velocity information for the same satellite using the ephemeris data and using the stored almanac data;

determining the error includes determining an error between the satellite location and velocity information determined from the ephemeris data and from the stored almanac data.

15. The method of Claim 14, determining satellite location and velocity information for the same satellite using the ephemeris data and using the stored almanac data during a common epoch.

16. The method of Claim 14, determining satellite location and velocity information for the same satellite using the ephemeris data and using the stored almanac data within a specified time interval of Time of Ephemeris (TOE) for the ephemeris data.

17. The method of Claim 14,
determining satellite information for the same satellite includes determining satellite location and velocity information for the same satellite using the ephemeris data and using the updated almanac data;

determining the error includes determining a revised error between the satellite location and velocity information determined from the ephemeris data and from the updated almanac data;

updating the updated almanac data based upon the revised error.

18. A method in a satellite positioning system receiver having stored almanac data, the method comprising:

determining, at corresponding time periods, location and velocity information for a satellite based on a plurality of issues of ephemeris data for the satellite;

determining location and velocity information for the satellite based on the stored almanac data for the satellite at the same time periods for which the location and velocity information based on the plurality of issues of ephemeris data was determined;

for each time period, determining error between the location and velocity information for the satellite based on the ephemeris data and the location and velocity information for the satellite based on the stored almanac data;

updating the stored almanac data based upon the error.

19. A method in a satellite positioning system receiver having a battery, the method comprising:

determining whether the receiver is connected to a power supply other than its battery;

beginning continuous reception of satellite positioning system navigation data when the receiver is connected to a power supply other than its battery;

storing the navigation data received in memory of the receiver.

20. The method of Claim 19, discontinuing reception of the satellite positioning system navigation data if the receiver is disconnected from the power supply other than its battery.

21. The method of Claim 19, continuing reception of the satellite positioning system navigation data until reception of the navigation data is complete if the receiver is disconnected from the power supply other than its battery during reception of the navigation data.

22. The method of Claim 21, continuing reception of the satellite positioning system navigation data if the receiver is disconnected from its power supply other than its battery only if a predetermined portion of the navigation data has already been received.

23. The method of Claim 19, receiving satellite positioning system navigation data includes receiving almanac information directly from a satellite.

24. The method of Claim 19, receiving satellite positioning system navigation data includes receiving ephemeris information directly from a satellite.

25. A method in a satellite positioning system receiver, the method comprising:

operating the receiver synchronously with an expected time of arrival of information from at least one satellite of a satellite positioning system;

receiving the information from the at least one satellite when the receiver is operating during the expected time of arrival of the information.

26. The method of Claim 25, operating the receiver synchronously with an expected arrival of specific subframe information from at least one satellite of a satellite positioning system, receiving the specific subframe information when the receiver is operating.

28. The method of Claim 25, synchronously disabling a receiver operation of the receiver during time periods when the arrival of the information is not expected.

29. The method of Claim 27, operating the receiver during time periods when the arrival of information is not expected for performing functions other than receiving the information.

30. The method of Claim 25, operating the receiver synchronously with an expected arrival of at least one of ephemeris and almanac information from at least one satellite of a satellite positioning system.

31. The method of Claim 25, operating the receiver synchronously with an expected arrival of at least one of clock correction information, ionospheric correction information, tropospheric correction information, universal time coordinate offset correction information.

32. The method of Claim 25, receiving navigation information from at least one satellite of the satellite positioning system when acquiring a satellite of the satellite positioning system.

33. The method of Claim 25, receiving navigation information from at least one satellite of the satellite positioning system when tracking a satellite of the satellite positioning system.

34. A method in a satellite positioning system receiver not attempting to acquire satellites, the method comprising:

determining that ephemeris data for at least one satellite stored on the satellite positioning system receiver is no longer useful for generating satellite acquisition assistance data;

periodically requesting updated ephemeris data for satellites from a communications network while the satellite positioning system receiver is not attempting to acquire satellites until the satellite positioning system receiver has received updated ephemeris data for the at least one satellite.

35. The method of Claim 34, periodically requesting updated ephemeris data for satellites from the communications network while the satellite positioning system receiver is not attempting to acquire satellites until the satellite positioning system receiver has received updated ephemeris data for all satellites.

36. A method in a satellite positioning system receiver, the method comprising:

determining that ephemeris data stored on the satellite positioning system receiver is outdated;

requesting current ephemeris data for the same satellite with a over-the-air message while not attempting to acquire satellites with the satellite positioning system receiver.

37. A method in a satellite positioning system receiver, the method comprising:

attempting to acquire at least one satellite with stored ephemeris data,

determining that the ephemeris data is too inaccurate to acquire the least one satellite;

requesting accurate ephemeris data for the same satellite in an over-the-air message.

38. A method in an SPS received enabled communication device having stored almanac data, the method comprising:

storing ephemeris data received from a cellular network;

selecting whether to use the stored almanac data or the stored ephemeris data for determining satellite acquisition information;

determining satellite acquisition information using the selected almanac data or ephemeris data.

39. The method of Claim 38, selecting the almanac data or ephemeris data based on the relative ages of the almanac and ephemeris data.

40. The method of Claim 38, selecting the almanac data or the ephemeris data based on the estimated accuracies of the almanac data and ephemeris data.